

REMARKS

The Examiner has rejected Claim 1 under 35 U.S.C. §112 second paragraph. As noted above, Applicant has amended the language of Claim 1 to express the thickness in “millimeters” and not “micrometers.”

In Claim 1, Applicant had stated in line 6: “*two support fin members*” as the antecedent basis for stating “...*each said fin member*...” following in the claim line and thereafter. Applicant has amended Claim 1 to read “support fin members” at each location where “*fin member*” was found.

The Examiner is requested to reconsider his rejection under 35 U.S.C. §102(b) of Claims 1 and 5 as being anticipated by Lee, et al. (US 6,008,989).

Claim 1 has been amended to distinguish the present invention from the Lee et al. reference. Applicant’s structure as claimed is totally different from what Lee et al. are disclosing. Claim 5 has been cancelled without prejudice so further discussion is need with respect to its rejection.

The disclosure set forth in Lee et al. relates to a device for easily and removably attaching a heat sink to a vertically mounted CPU module. The Lee invention is a pair of intermediate brackets which serve to secure one element (heat sink) to another CPU module. It is not a heat sink nor is it designed to function as a heat dissipation device *per se* used with a printed wiring board.

Claim 1 now covers: “A heat dissipating device for improving the transfer of heat from at least one heat source mounted on a planar support to a heat sink radiating into the ambient, comprising:
a heat source semiconductor chip device on a common wiring bearing planar support,
said semiconductor chip device on said common wiring bearing planar support, forming a combination, said combination comprising an area,
a modular assembly of a plurality of support fin members aligned side by side, said support fin members being in horizontal and vertical alignment with one another and covering said combination comprising said area;
each said fin member having been formed from a single sheet and folded into a substantially inverse U shape, each said fin member having first and second side arms diametrically opposite each other, each said support fin member first and second side arm having an inside surface, an outside surface and an edge, each said edge having a finger portion;

a plurality of parallel beam members made from heat conducting material, each said beam member having top, bottom and first and second side walls, said first and second side walls of each beam member being positioned between and in contact with said inside surface of said first and second side arms respectively of each said fin member; said finger portion of said edge extending below said bottom wall of said beam member and is being folded inwardly toward a center line of each said beam member into a bent position to form a contacting support structure which is a compliant interface in contact with said heat source to dissipate heat emanating from said source to the ambient heat dissipation device. "

The basis for the language in the claim is found in both the specification and Figure 1 of the drawings.

The Examiner apparently has taken the position in the rejection that the "securing device" meets the "fin members" disclosed by Applicant. Lee et al. mention "resilient claws" of the securing device securely engaged with openings present in the CPU which provide the heat sink assembly with the capability to withstand affects of shock and vibration.

The securing device is a pair of thin brackets that serve to secure the heat sink to the CPU module.

The description of the invention by Lee clearly shows the difference between Lee and the present invention. In the reference to FIG. 1, Lee discloses a securing device 30 for attaching a heat sink 10 to a CPU module 70. There are two separate elements to the Lee invention: the securing device which comprises the various elements denoted 30 in Figure 1 and the heat sink element 10 fixed to CPU module 70.

By way of contrast, in Applicants invention, the fingers 14 contact the chip first. The idea is that the fingers are the extension of the fin body 6, which are the main heat transfer surface to the air passing through the fin body. In this arrangement, heat coming from the chip is directly conducted to the fin body. In the prior art, heat usually goes to the base of heat sink and then the fins, such that heat needs to go through the interface between the heat sink base and the fins and hence encounters higher thermal resistance. Consequently, lower the efficiency of the heat sink. The current application eliminates this drawback.

The "compliant interface" 13 describes that the contact interface between the finger outer surface and the chip is somewhat flexible and adaptable in the way the interface can accommodate the issues of planarity, flatness, movement, and thermal expansion of the underlying chip. For example, if the heat sink is not parallel with the chip surface and the heat sink base is rigid, the gap between the heat sink base and the chip may vary. That is, part of the contact interface has larger gap and part has no gap. The local heat transfer from the chip to the heat sink will be impeded at the location that has larger gap. This is a big disadvantage of the prior art heat sink with rigid base. The current invention solves this problem. This feature is not a focus of the Lee invention.

The basis for the claim language is found in the specification and drawings as noted above. If the Examiner wishes, the language of Claim 12 will be inserted into the specification by Applicant.

The Examiner is respectfully requested to reconsider the rejections of Claims 2 and 3 under 35 U.S.C. 103(a) as being unpatentable over Lee, et al. (US 6,008,989) in view of Bradt (US 5,909,358).

The remarks presented above with respect to the Lee et al. reference are incorporated by reference herein. Applicant is not clear as to the relevance of the Bradt reference to the instant invention. Bradt discloses a "clip" which is made of a metal. Applicant is claiming a side which comprises a part of the heat sink assembly.

The Examiner is respectfully requested to reconsider the rejections of Claims 4 and 6 under 35 U.S.C. 103(a) as being unpatentable over Lee, et al. (US 6,008,989) in view of Bradt (US 5,909,358) and further in view of Lin et al. (US 6,188,578).

The skilled artisan would not look to either of the secondary references as there is no suggestion to do so. Lin et al. relates to "flip chip" technology which is different from the bracket technology of Lee et al. and the heat sink clip of Bradt. The requirements in all three disciplines are antithetical to one another.

For example, Figs. 3(a), (b), (c) are variations of the finger arrangement. All the fingers will contact the chip first and directly. Furthermore, the folding fingers in Fig. 1 provides an additional spring force to make a much compliant contact with the chip or other heat generating surface. In other words, the folding structure in forming the fingers gives a natural spring force to force the bottom surface of the fingers in contact with the chip.

In Fig. 3a, the member 42 is thermal grease which resides between the beam 12 and the inner surface of the finger 14. This thermal grease will further reduce the thermal resistance between the finger bottom surface to the chip when the grease flows and fills the gap therein. It also reduces the thermal resistance between the fin body and the beam 12, which is the secondary heat path in addition to the primary heat path from the finger to the fin body.

Fig. 3b uses elastomeric resilience 32 to improve the natural spring force created by the folding structure of the fingers. When the heat sink is forced in contact with the chip, the fingers will be bent further close to the bottom surface of the beam 12. In this case, the elastomeric resilience provides another reaction force to push the fingers toward the chip. The end result is larger local force to make the fingers in better contact with the chip and hence a better thermal contact to transfer heat from the chip to the fin body.

Fig. 3c uses low melting point solder 22 instead of thermal grease 42. The function of low melting point solder is the same as that of thermal grease as in Fig. 3a. It may work better thermally since low melting point solder generally has high thermal conductivity, which should give even better thermal contact than that of thermal grease. This assumes that the solder will melt (that is , change from solid to liquid phase) when the temperature at the finger and chip interface is higher than the melting point of the solder.

The prior art cited, alone or in combination does not function as explained above nor does it provide the benefits of Applicant's invention.

In order to analyze the propriety of the Examiner's rejections in this case, a review of the pertinent applicable law relating to 35 U.S.C. § 103 is warranted. The Examiner has applied the Lee et al., Bradt and Lin et al. references discussed above using selective combinations to render obvious the invention.

The Court of Appeals for the Federal Circuit has set guidelines governing such application of references. These guidelines are, as stated are found in Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 USPQ, 543, 551:

When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than hindsight gleaned from the invention itself.

A representative case relying upon this rule of law is Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 USPQ 2d 1434 (Fed. Cir. 1988). The district court in Uniroyal found that a combination of various features from a plurality of prior art references suggested the claimed invention of the patent in suit. The Federal Circuit in its decision found that the district court did not show, however, that there was any teaching or suggestion in any of the references, or in the prior art as a whole, that would lead one with ordinary skill in the art to make the combination. The Federal Circuit opined:

Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. [837 F.2d at 1051, 5 USPQ 2d at 1438, citing Lindemann, 730 F.2d 1452, 221 USPQ 481, 488 (Fed. Cir. 1984).]

Applicants respectfully submit that there is no basis for the combination of the aforementioned references cited by the Examiner. Applicants respectfully point that the Lee et al., Bradt and Lin et al. references have totally different objectives in mind. The Examiner has selected individual elements from these disparate references for the sake of showing the individual elements claimed without regard to the total teaching of the references.

The Examiner is improperly picking and choosing. The rejections are piecemeal constructions of the invention. It is essentially including the elements missing from Lee et al. with the elements conveniently found in Bradt and Lin et al. references which alone or in combination are directed to a totally different species. Such piecemeal reconstruction of the

prior art patents in light of the instant disclosure is contrary to the requirements of 35 U.S.C. § 103.

The ever present question in cases within the ambit of 35 U.S.C. § 103 is whether the subject matter as a whole would have been obvious to one of ordinary skill in the art following the teachings of the prior art at the time the invention was made. It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. (Emphasis in original) In re Wesslau 147 U.S.P.Q. 391, 393 (CCPA 1965)

This holding succinctly summarizes the Examiner's application of references in this case because he did in fact pick and choose so much of the references to Bradt and Lin et al. references to support his position and did not cover completely in the Office Action the full scope of what these varied disclosure references fairly suggest to one skilled in the art.

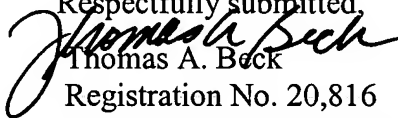
Further, the Federal Circuit has stated that the Patent Office bears the burden of establishing obviousness, and that this burden can only be satisfied by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the reference.

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." ACS Hosp. Sys., 732 F.2d at 1577, 221 USPQ at 933. [837 F.2d at 1075, 5 USPQ 2d at 1599.]

The court concluded its discussion of this issue by stating that teachings or references can be combined only if there is some suggestion or incentive to do so.

In the present case, the skilled artisan viewing the any or all of the references would be directed toward a totally different system than is called for in the present invention.

In view of the arguments and modifications to the claims, allowance of this case is warranted. Such favorable action is respectfully solicited.

Respectfully submitted,

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I hereby certify that this amendment response is being mailed via the United States Postal Service, first class mail, postage prepaid on the date indicated below addressed to Commissioner of Patents & Trademarks, Post Office Box 1450, Alexandria, VA 22313-1450



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